

CLAIMS

1) A hybrid drive assembly (1) for a vehicle having at least one drive wheel (2), the drive assembly comprising an internal combustion engine (3); and a transmission unit (5) interposed between a drive shaft (4) of the internal combustion engine (3) and a propeller shaft (6) connected angularly to the drive wheel (2), and in turn comprising a clutch (8) and a transmission (7) having a drive element (10) connected angularly to the drive shaft (4) of the internal combustion engine (3) and a driven element (11) connectable to said propeller shaft (6); the drive assembly (1) further including an electric machine (32) which can be operated instead of or in combination with said internal combustion engine (3), **characterised in that** said clutch (8) is interposed between said driven element (11) of said transmission and said propeller shaft (6), and has a drive member (20) connectable to said driven element (11) of said transmission (7) and a driven member (26) connected to the propeller shaft (6), said electric machine (32) comprising a rotor (35) connected angularly and permanently to said driven member (26) of said clutch (8).

25 2) A drive assembly as claimed in Claim 1, characterized in that said transmission (7) is a CVT, said drive element (10) and driven element (11) consisting of a drive pulley (10) and, respectively, a

driven pulley (11) of said CVT.

3) A drive assembly as claimed in Claim 1 or 2, characterized in that said clutch (8) is a centrifugal clutch; said driven member of said clutch (8) being a bell (26) integral with said propeller shaft (6).

4) A drive assembly as claimed in Claim 3, characterized in that said rotor (35) of said electric machine (32) is coaxial and integral with said bell (26) of said clutch (8).

10 5) A drive assembly as claimed in any one of the foregoing Claims, characterized in that said electric machine (32) is reversible.

15 6) A drive assembly as claimed in one of the foregoing Claims, characterized by comprising a coupling (51) interposed between said drive shaft (4) and said drive member (20) of said clutch (8).

7) A drive assembly as claimed in Claim 6, characterized in that said coupling (51) is controlled electromagnetically.

20 8) A drive assembly as claimed in Claim 6 or 7, when dependent on one of Claims 2 to 5, characterized in that said coupling (51) is interposed between said driven pulley (11) and said drive member (20) of said clutch (8).

25 9) A drive assembly as claimed in any one of the foregoing Claims, characterized by comprising an electric generator (37) driven by said internal combustion engine (3).

10) A drive assembly as claimed in any one of the foregoing Claims, characterized by comprising a control unit (38) for controlling said internal combustion engine (3) and said electric machine (32), in response to a number of input signals (Sa, Sf, Ss), in a number of 5 operating modes comprising at least a combustion mode wherein only the internal combustion engine (3) is activated, an electric mode wherein said electric machine (32) operates as a motor and said internal combustion engine (3) is disabled, a parallel hybrid mode wherein said internal combustion engine (3) and said electric machine (32) are both activated and connected to said drive wheel (2), and a series hybrid mode wherein said internal combustion engine is disconnected from said 10 drive wheel (2) and drives said electric generator (37).
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11) A drive assembly as claimed in Claim 10, characterized by comprising selecting means (46) for selecting said operating modes of said drive assembly (1); said input signals (Sa, Sf, Ss) comprising at least 20 a number of input signals (Ss) generated by said selecting means (46).

12) A drive assembly as claimed in Claim 10 or 11, characterized in that said input signals (Sa, Sf, Ss) comprise a signal (Sa) indicating the position of an 25 accelerator member (44).

13) A drive assembly as claimed in one of Claims 10 to 12, characterized in that said input signals (Sa, Sf, Ss) comprise a signal indicating actions on a brake

control member (45) of the vehicle.

14) A vehicle having at least one drive wheel (2), characterized by comprising a hybrid drive assembly (1) as claimed in any one of the foregoing Claims.

5 15) A vehicle as claimed in Claimed 14, characterized by being a scooter.